Incident:
Cotton Patch Bayou Acid Release, a.k.a., Agrifos Phosphoric Acid Release, Pasadena, Harrison County, Texas

Brief Summary:
On 16 August 2007, excessive rainfall contributed to the failure of a portion of the moat retaining wall at the South Gypsum Stack. The water within the moat is recycled process water and leachate from the gypsum stack with a pH of 2 (or less) due to phosphoric acid concentration. The true quantity of acidic water released is unknown, but estimates of 6 to 10 million gallons (or more) between 16 August and 7 September have been discussed.

Current Situation:
The facility is currently in a managed emergency situation. The South Gypsum Stack and associated moat are thought to be stable, but there is very little excess capacity to deal with process water at the site. Any significant rain event could easily threaten to overflow the moat, or worse, create a situation that the stack itself may be at risk of a failure. To reduce these threats, an estimated 25 million gallons of acid water must be removed from the South Stack. Another 10 million gallons of water at the No. 4 stack should also be treated since the two stacks are managed in combined manner at present. Combined, some 35 million gallons of process water needs to be removed from the two stack systems to shift the facility operations to a posture that would be considered “normal.”

At the site, a rainfall of 1 inch equates to an additional 9 million gallons of water. A major rainfall event would quickly shift the situation into a potentially unstable, emergency situation. There are still contamination issues within the drainage path of the original release, and these are currently being monitored and investigated. Options for treating the current water excess are being investigated, and the facility is working with state and federal responders on-scene to develop contingency plans for a major rain event, or any event that would threaten the failure of either the moat or gypsum pile itself. In short, there are no simple or rapid solutions to mitigate the current water budget excess. Alternative water storage sites are limited because of the large acid water volume. Treatment options, on-site and off-site, are being assessed.

Background
On 16 August 2007, the Pasadena, TX area experienced an estimated 8 inches of rainfall that added to a higher than normal seasonal rainfall average. The rainfall contributed to an excess of acidic water at the 240 acre gypsum stack identified as the South Gypsum Stack, or simply the South Stack. One result of the 16 August rain event was the failure of a portion of the retaining wall on the north side of the South Stack. The breech was discovered on 17 August. Since then, there have been periodic releases of acidic water from the facility. The total volume lost is unknown, but estimates of 6 to10 million gallons (or more) of

Phosphoric acid solution, pH 2, have been discussed. The site was originally a mobile mining Facility, but was purchased by Agrifos in 1998.

Agrifos, the principal RP, is a fertilizing facility that extracts phosphorus from mineral ores. The byproduct wastes include phosphoric acid, gypsum, fluoride, sulfates, and processed water, which are often stored as large piles of solids. Surrounding each stack is a moat that contains processed water that has leached through the gypsum and is normally recycled within the plant. The moat water has a pH of 2.0 (or less) and is mostly phosphoric acid solution that also contains heavy metals, ammonia, and other constituents.

When the retaining wall failed at the South Stack on, or shortly after 16 August, the released process water first entered a county drainage ditch that runs beside the north side of the South Stack. Form there, the acid flowed into the Cotton Patch Bayou, into a short barge canal, and then into the Houston Ship Channel (see attached maps for location). There have been reports of a fish kill (or fish kills), but the extent may have been limited to the small bayou and the canal. Monitoring by the facility has indicted that there was evidence of residual pH from the phosphoric acid in the small canal that connects to the Houston Ship Channel. Monitoring data (pH values only) from 4 and 8 September are provided for comparison. The upper portion of the water column in the ship canal has returned to near normal pH conditions, but there is still reduced pH values detected near the water bottom as of 9 September. Note, the small barge canal is not the Houston Ship Channel itself, but rather connects to the ship channel. The wall failure has been temporarily repaired. The facility managers report that they are still in an emergency situation because of the lack of capacity to deal with any new water from rain.

The 1992 Failure:
At this same facility in 1992, a 600 foot long section of the gypsum slurry pile (stack) failed. At the time, this facility was owned by Mobil Mining and Minerals facility. The failure caused 45 million gallons of a 3 percent phosphoric acid and hydrated gypsum mixture to spill through a small bayou and into the Houston Ship Channel. Most of the material was released on that one day but leaking continued for several days. This mixture flooded control ditches, open fields, and bayous. Gypsum and phosphoric acid water are classified as toxic and hazardous materials according to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Although the ship channel is heavily industrialized, the nearby small bayous and wetlands are extensively used by juvenile fish and crustaceans. The spill caused significant injuries to freshwater, marine, and estuarine wildlife, fishes, invertebrates, plants and sediments. There was a significant loss of habitat for terrestrial and aquatic animals in the upland fields and drainage canals. There was also direct mortality to terrestrial animals, primarily ground-nesting birds, rodents, and reptiles. The injury to the surface waters was widespread. The spilled material had a Ph of 1.5 and adversely

affected the water quality within approximately 7 miles of the Houston Ship Channel for at least one week.

Note, this summary was prepared as part of the emergency response to the Cotton Patch Bayou Incident at the Agrifos Facility, Pasadena TX. This document has not been reviewed, and is intended only as an initial summary. Prepared for RRT6 by Charlie Henry, NOAA Scientific Support Coordinator.